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<p>(21) International Application Number: PCT/US97/07093 (22) International Filing Date: 28 April 1997 (28.04.97) (30) Priority Data: 96106865.7 1 May 1996 (01.05.96) EP (34) Countries for which the regional or international application was filed: BE et al. (71) Applicant (for all designated States except US): THE PROCTER & GAMBLE COMPANY [US/US]; One Procter & Gamble Plaza, Cincinnati, OH 45202 (US). (72) Inventor; and (75) Inventor/Applicant (for US only): BITOWFT, Bruce, Kevin [US/DE]; Im Hirschgraben 19, D-61479 Glashütten (DE). (74) Agents: REED, T., David et al.; The Procter & Gamble Company, 5299 Spring Grove Avenue, Cincinnati, OH 45217 (US).</p>		<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p>
<p>(54) Title: STRETCH WRAPPED UNITS FOR FLEXIBLE ARTICLES</p> <div data-bbox="516 1136 1182 1640"> </div> <p>(57) Abstract</p> <p>A unit (10) comprising an array (11) of at least two substantially parallelepipedal flexible packs (12), said packs (12) comprising compressed flexible articles (14) encased in a flexible bag (13), said compressed articles (14) having been compressed to between 20 percent and 70 percent of their uncompressed volume in a direction of compression C, said array (11) comprising a top face (15), a bottom face (16), a front face (17), a back face (18) and two side faces (19, 20) characterised in that said unit (10) comprises a cold stretchable plastic film (21) disposed adjacent at least a part of at least four consecutive faces (15, 16, 17, 18, 19, 20) of said array (11) and said cold stretchable plastic film (21) non-adhesively attaches to said top face (15), said bottom face (16), said front face (17), said back face (18) and said side faces (19, 20) of said array (11).</p>		

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STRETCH WRAPPED UNITS FOR FLEXIBLE ARTICLES

Field of the invention

The invention relates to an array of packs, comprising compressed flexible articles encased in flexible bags, which are stretch wrapped with a cold stretchable plastic film and sealed to form a rigid stretch wrapped unit.

Description of the prior art

It is widely known in the art to pack an array of flexible packs comprising compressed flexible articles encased in flexible bags in cardboard cases of fixed dimensions for ease of handling, storage and transport. The space inside these cases cannot be fully utilised because of the tolerances imposed by the variations in the pack dimensions resulting from the production processes and the usual automatic mechanical packaging systems. Furthermore, due to the deviations in the pack dimensions resulting from the packing of compressible flexible articles into flexible bags, the cardboard cases need to be over-dimensioned. As a consequence of this over-dimensioning, arrays of packs on the bottom of pallets are incapable of supporting the imposed loads when pallets of products are stacked or grouped three pallets high. Therefore, the cardboard cases must be designed to support the extra loads.

An array of packs of compressed flexible articles can also be wrapped in a plastic film. The plastic film can comprise relatively inexpensive materials such as polymeric films or thermoplastic films. Such materials reduce the severity of the disposal problem from an environmental standpoint both with respect to the amount of wrapping material required and the disposability/degradability of the particular wrapping material. In addition, plastic film is lighter and more flexible than cardboard, which is heavy, requires space and has less flexibility for storage since it is rigid and in use continues to occupy the same amount of space even when nearly empty.

Prior art developments include US 5,049,423, which discloses thermoplastic films and more particularly, thermoplastic films having properties making them especially suitable for use as stretch wraps for various foodstuffs, rolls of carpet, liquid containers etc. in various bundling and palletising operations. The load of the pallet may be bundled by stretch wrapping a film several times around the articles to be palletised. The document focuses on the properties of the thermoplastic film.

EP O 294 339 A2 discloses a machine for packaging a plurality of articles, either loose, collected on a tray or inside a container, within a cold stretchable or a semi-stretchable type of film web. The machine includes a stretching device which prevents shrinking of the central region of the film in the longitudinal direction, a wrapping device and a complete sealing unit which seals the film ends while the film is still under tension. The invention takes advantage of the elastic memory of the film web to tightly enclose the packaged articles rather than using the compressibility of the articles to form a rigid stretch wrapped unit.

DE 33 41 897 A1 discloses a process developed by the Hagemann company which results in a stretch wrapped product. The machine wraps articles in pre-stretched film, which contracts at a later stage. The film is drawn from a reeling device under tension and continuously wound in a spiral fashion around the conveyor belt and reels to form a tube, whose end is drawn off. The machine can wrap loosely stacked articles in continuous action and single articles can be handled. The invention does not teach a stretch wrapping process which exploits the compressibility of an array of packs of flexible articles.

Therefore, the prior art does not teach a wrapping system which is independent of the fixed dimensions of the outer cases, which exploits the compressibility of an array of packs of flexible articles and which allows the possibility of sealing the sides of the array of packs to form a completely closed unit.

Object and summary of the invention

The object of the present invention is to produce a rigid and stable unit by stretch wrapping an array of flexible packs of disposable absorbent diapers, sanitary articles, incontinent pads or briefs, bandages and the like, with a cold stretchable plastic film.

The present invention eliminates cardboard as a packaging material by making use of a plastic film, which is stretch wrapped around four consecutive faces of an array of flexible packs. This has subsequently led to several benefits namely, units that are more stable and that are capable of sustaining higher load carrying capacities; a reduction in the overall weight of the units to be handled, stored and transported; a decrease in the level of waste packaging material; and an improved and optimised pallet fit during handling, storage and transport operations.

In accordance with the object of the invention, a unit comprising an array of at least two substantially parallelepipedal packs is provided. The unit has a top face, a bottom face, a front face, a back face and two side faces and comprises a cold stretchable plastic film, which is disposed adjacent to at least four consecutive faces of the array of packs. The cold stretchable plastic film non-adhesively attaches to the faces of the array. Two options exist: either the faces of the array not covered by the cold stretchable plastic film can be left exposed to the environment or the cold stretchable plastic film can be made wide enough to cover the remaining two faces of the array and can be sealed to form a closed unit by a variety of means.

According to the present invention, the object is achieved by a unit having the characteristics specified in the claims.

Brief description of the drawings

The invention will be described hereinafter with reference to the following drawings:

Figure 1 shows a pack comprising compressed flexible articles encased in a flexible bag;

Figure 2 is a perspective view of an array of five packs and a cold stretchable plastic film disposed adjacent to four consecutive faces of the array.

Detailed description of the invention

Figure 1 shows a pack 12 comprising compressed flexible articles 14 encased in a flexible bag 13. The substantially parallelipedal packs 12 are arranged in an up-on-base configuration. Other configurations such as flat-on-face and up-on-side are also possible. The compressed flexible articles 14 may comprise disposable absorbent diapers, sanitary articles, incontinent pads or briefs, bandages and the like. The flexible articles 14 are compressed to between 20 and 70 percent of their uncompressed volume in a direction of compression C. In particular, figure 1 shows a diaper pack 12 comprising between one to fifty disposable absorbent diapers 14 and a plastic bag 13 with a thickness ranging from 20 to 120 micrometres. A method for the compression packing of disposable absorbent diapers into flexible bags has been described in detail in the following patents US 4,934,535, US 4,966,286, US 5,022,216, US 5,050,742 and US 5,150,561.

As is displayed in figure 2, the packs 12 are arranged in the form of an array 11 before transport and storage. An array 11 usually comprises at least two substantially parallelipedal packs 12. More specifically, figure 2 shows a perspective view of a substantially covered array 11 comprising five substantially parallelepipedal packs 12 of the type shown in figure 1. The stretch wrapped array forms the unit 10. For the purposes of transport and storage, a number of units 10 can be stacked or grouped in a plurality of configurations to form a case on a pallet such that a load can be applied to a top panel or to a side panel of the case with the direction of the load being perpendicular to the direction of compression, which is around the circumference of the case. The units are less compressible in directions perpendicular to the direction of compression.

In figure 2, the unit 10 comprises a top face 15, a bottom face 16, a front face 17, a back face 18 and two side faces 19, 20 and a cold

stretchable plastic film 21, which is disposed adjacent to at least four consecutive faces of the array 11 of packs 12. Three stretch wrapping configurations are possible with permutations, namely the cold stretchable film 21 can be disposed adjacent to the top face 15, the back face 18, the bottom face 16 and the front face 17; the side face 19, the top face 15, the remaining side face 20 and the bottom face 16; or the back face 18, the side face 20, the front face 17 and the remaining side face 19. The cold stretchable plastic film 21 non-adhesively attaches to all the faces 15, 16 17, 18, 19, 20 of the array 11. The faces 15, 16 17, 18, 19, 20, depending on the selected stretch wrapping configuration, not covered by the cold stretchable plastic film 21 remain exposed to the environment. In figure 2, in particular, the cold stretchable plastic film 21 is wrapped around the side face 19, the top face 15, the remaining side face 20 and the bottom face 16.

The cold stretchable plastic film 21 can also be disposed adjacent to the top face 15, the back face 18, the bottom face 16, the front face 17 and the side faces 19, 20 of the array 11 to form a completely closed unit 10.

The preferred film 21 is a cold stretchable polyethylene film, which is a plastic film that after being stretched exhibits the property of elastic memory. Such a property enables the film to return substantially to its starting dimensions. The preferred thickness for the cold stretchable film 21 ranges from 15-60 micrometres and it can be stretched in an elongation range from 80-150 percent. The cold stretchable film 21 may either be transparent, white or coloured and in addition, it may comprise graphical indicia, which can also be coloured. By tightly stretch wrapping the cold stretchable film 21 around the array 11 of packs 12, the stability of the array 11 is improved without resulting in a deterioration of the substantially parallelepipedal shape of the array 11. Furthermore, a strong and rigid outer casing for the array 11 is created, which guarantees stability.

What is claimed is:

1. A unit (10) comprising an array (11) of at least two substantially parallelepipedal packs (12), said packs (12) comprising compressed flexible articles (14) encased in a flexible bag (13), said compressed articles (14) having been compressed to between 20 percent and 70 percent of their uncompressed volume in a direction of compression C, said array (11) comprising a top face (15), a bottom face (16), a front face (17), a back face (18) and two side faces (19, 20) characterised in that

said unit (10) comprises a cold stretchable plastic film (21) disposed adjacent at least four consecutive faces (15, 16, 17, 18, 19, 20) of said array (11) and said cold stretchable plastic film (21) non-adhesively attaches to said top face (15), said bottom face (16), said front face (17), said back face (18) and said side faces (19, 20) of said array (11).

2. A unit (10) according to claim 1 wherein said faces (15, 16, 17, 18, 19, 20) of said array (11) not covered by said cold stretchable plastic film (21) remain exposed to the environment.

3. A unit (10) according to claim 1 wherein said cold stretchable plastic film (21) is disposed adjacent said top face (15), said bottom face (16), said front face (17), said back face (18) and said side faces (19, 20) of said array (11) and sealed to form a closed unit.

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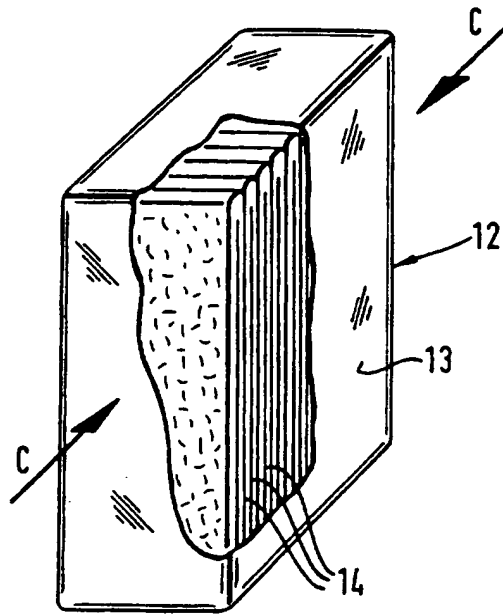
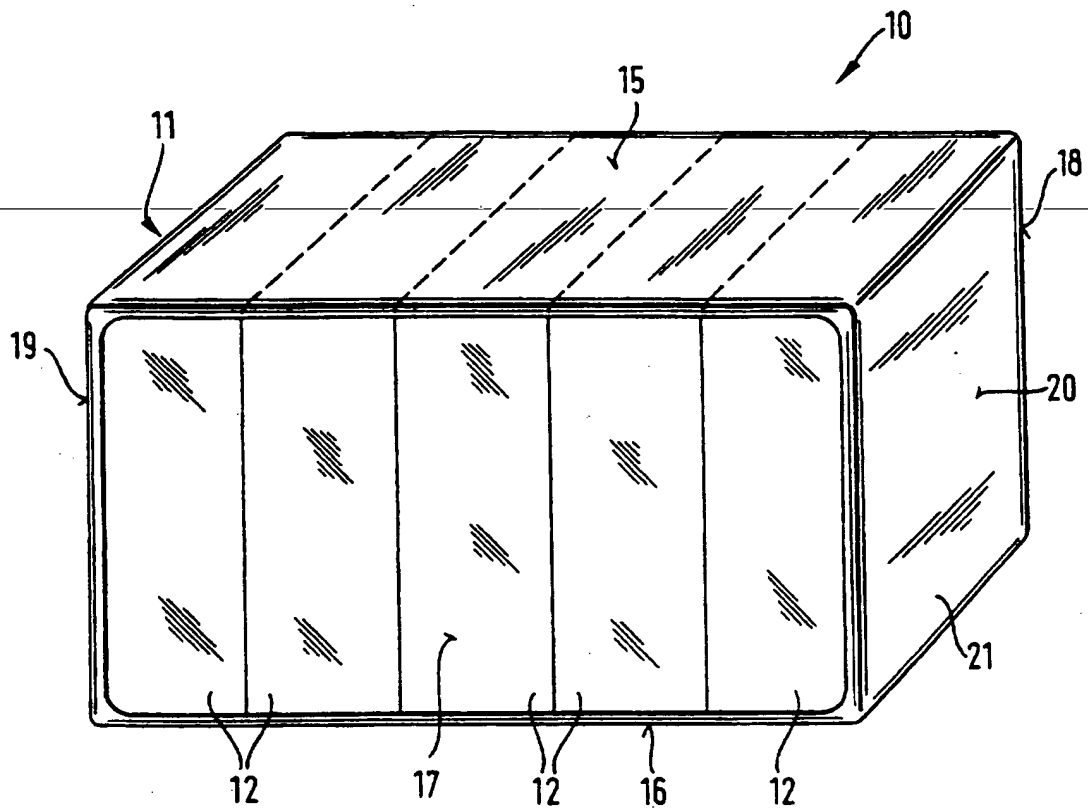


Fig. 1

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***Fig. 2***

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 97/07093

A. CLASSIFICATION OF SUBJECT MATTER IPC(6) :B65D 75/00 US CL :206/494 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 206/428, 432, 494, 499, 526 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 3,458,036 (JAMES) 29 JULY 1969.	1
A	US, A, 4,177,895 (SHELTON) 11 DECEMBER 1979.	1
A	US, A, 4,624,991 (HAAS) 25 NOVEMBER 1986.	1
Y	US, A, 4,920,731 (RIMONDI ET AL.) 01 MAY 1990. SEE COL. 2, LINE 2.	1-3
A	US, A, 4,972,659 (CAZES) 27 NOVEMBER 1990.	1
A	US, A, 5,111,931 (GOMBOS ET AL.) 12 MAY 1992.	1
Y	US, A, 5,380,094 (SCHMIDT ET AL.) 10 JANUARY 1995, SEE FIGURES 1-3.	1-3
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